

Amendment Under 37 C.F.R. § 1.111
USSN 10/607,205
Attorney Docket Q76357
July 7, 2005

REMARKS

In the last Office Action Claims 1-53 inclusive were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Claims 1-27, 29-39, 41-46, 48-50, 52 and 53 were rejected on the basis of prior art. Claims 28, 40, 47 and 51 were indicated as being directed to allowable subject matter.

Claims 1-53 inclusive have been cancelled without prejudice in order to advance the prosecution of the present application and new Claims 54-98 inclusive have been substituted therefore. Reconsideration and allowance of the claims are respectfully requested in view of the following remarks.

On the merits, a number of independent claims are now proposed. Each of the independent claims now clearly indicates that the transferring means of the invention are used for transferring bars in and out of a bending station comprising one or more bending units, i.e. they include first transferring means for transferring bars to be bent from a first station (20) to a bending station, and second transferring means for transferring bars which have been bent at the bending station from the latter to an unloading station (28). Moreover, each independent claim now more precisely indicates that the first transferring means comprise a supporting frame (13), and one or more grippers (2) each including a gripper supporting structure (5) guided relative to the supporting frame (13) so as to be movable at least along two directions: the longitudinal and horizontal direction (A) of the bars and a horizontal direction (X) transverse to this longitudinal direction (A). Moreover, each independent claim now clearly indicates that the two jaws (2) of

each gripper (2) are mounted on a wrist member (3) which on its turn is pivotally mounted on the gripper supporting structure (5) around a substantially horizontal articulation axis (4). Moreover, each independent claim now stresses the fact that, due to the provision of the above mentioned wrist member (3), each gripper (2) can be oriented at any angular position while the gripper supporting structure (5) is able to be moved along any of the above mentioned longitudinal and transverse directions (A, X) relative to the bending station. Finally, each independent claim now stresses the fact that each gripper (2) is able to be moved along any of the above mentioned two directions (A, X) to transfer a plurality of coplanar bars from the first station (20) to the bending station while changing orientation of the plane.

Turning to the cited prior art, ENG *et al.* do not anticipate the provision of gripper for loading the bars on the bending station which can rotate so as to change the orientation of the plane of the bars. More specifically ENG *et al.* does not show the provision of an articulated wrist (3) carrying the gripper jaws on a gripper supporting structure (5) which is free to move relative to the bending station both in the transverse direction (X) and also in the longitudinal direction (A). The lack of the above indicated feature in ENG *et al.* causes a clearly apparent disadvantage. Transferring the bars from the first station to the bending station cannot be accomplished by the grippers which are guided relative to the support frame in the longitudinal and transverse directions (A, X), since the plane in which the bars are arranged at the bending station is a substantially vertical plane, whereas the plane in which the bars are arranged at the first station is substantially horizontal (or more precisely slightly inclined relative to the horizontal). Therefore, as clearly visible in figures 2 and 3A, the apparatus of ENG *et al.* is

much more complicated than the apparatus of the invention, since it must include a further device (130), with a further gripper rotatable around a stationary axis (132) in order to grip the bars at the first station and to place them in a vertical plane where they can be engaged by the gripper device (141) above to transfer the bars to the bending station. On the contrary, as indicated in the newly submitted claims the grippers of the invention are able to perform to the complete operation of transferring the bars from the first station to the bending station, due to the provision of the above mentioned articulated wrist member on the gripper supporting structure which is movable along the longitudinal and transverse directions (A, X).

It is further submitted that providing the apparatus of ENG *et al.* with grippers that can rotate so as to change the orientation of the plane of the bars cannot be considered as being obvious in view of any of the other references, since none of them disclose a device capable of changing the orientation of the plane of bars while they are being moved relative to a bending station. Antoszewski *et al.* merely discloses a modular robotic wrist system for use with an industrial manipulator in order to provide easy addition of one or more rotational axes on a robot arm. Kidera *et al.* discloses an anthropomorphic manipulator, which is not capable of moving the bar in the longitudinal direction thereof, without imparting also a transverse movement to the bar, which instead is possible in the invention where at least two (cartesian) mutually orthogonal and horizontal directions of movement are provided that are controllable independently from each other.

It is noted that ENG *et al.* did not even remotely conceive the provision of an articulated wrist member on the gripper supporting structure which is movable along the above mentioned

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longitudinal and transverse directions (A, X) and accepted the burden of a separate device 130 to turn the bars. It would appear therefore that the invention could be derivable from the combination of the prior references only by hindsight analysis of these references. Due to the elimination of the feeding device 130 of ENG, the invention achieves the object of providing a truly automatic installation which can be programmed to perform the whole cycle of operations to which the bars must be subjected.

Independent Claims 84 and 97 reflect the above indicated features of the invention.

Moreover, the following further independent claims include further distinguishing features:

Independent Claim 54 further comprises that the same grippers are used to load and unload the bars from the bending station, which is not true of ENG, which uses different grippers for this purpose, which are movable on different frames.

Independent Claim 56 further indicates that the first station where the grippers pick up the bars is directly the supporting surface on the which the bars are to be cut, which again is not anticipated by ENG *et al.*, where a device 130 is provided to feed the bars to the grippers. The device 130 of ENG *et al.* takes the bars from the chain conveyor 130 on which must be fed from a storage 110. Thus, the device of ENG *et al.* is much more complicated and difficult to be automated, while full automation is easily achievable with the device of the invention.

Independent Claim 75 indicates that the third axis of movement of the grippers is inclined both to the vertical and horizontal, which again is not anticipated by ENG thus, the bars can be unloaded from the bending station exploiting the gravity, due to the inclination of the working

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plane of the bending station. Moreover, during the bending operation, not all the bar weight is applied orthogonally to the bending plane of the bending station, which renders some specific bending operation where the bar ends are overlapped easier.

Independent Claim 78 further indicates that the gripper is rotatable around the third direction, which adds to the installation flexibility.

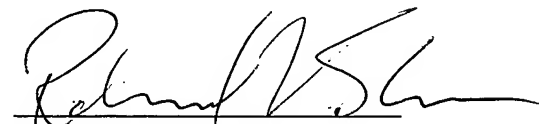
In view of the foregoing discussion it is submitted that new Claims 54-98 are clearly patentable over the teachings of the references of records, taken either alone or in combination with each other. Therefore, it is respectfully requested that these claims be allowed and the application passed to issue forthwith.

If for any reason the Examiner is unable to allow the application on the next Office Action and feels that an interview would be helpful to resolve any remaining issue, the Examiner is respectfully requested to contact the undersigned attorney for the purpose of arranging such an interview.

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